of three feet, in the midst of which were sharp splinters of flint, and a thick mass of broken and split bones, and the shattered skulls and jaw bones of a heterogeneous mass of animals of all kinds. In the lowest layer no trace of men, either by their remains or by their handiwork, could be found, all the remains consisted of bones of animals, chiefly the cave bear, hyæna, and lion. These cave-dwelling animals appear to have been the first and earliest possessors of the cave. But soon after this men must have discovered the cave and inhabited it, for from this layer up to the newest layer of all the presence of man is clearly shown, and the remains of their feasts and of their daily life are mingled with those of the previously-named animals. The most numerous remains consist of flints of which many thousand were found, but these do not appear to have been used as implements, but come rather under the category of flint-flakes, the chippings from knives, saws, lances, &c. The most perfect one found is three inches long, and half-an-inch wide, and is toothed like a saw, and was probably used as such to saw off the ends of the deer's horns, of which quantities were found.

In order to judge the age in which men began to inhabit this cave, we must examine the remains of the bones and skeletons of the animals which they hunted, and whose flesh was eaten in the cave. The most conspicuous amongst these is the cave bear, and although it might at first sight appear very difficult to recognise in the broken and burnt bits of bone that they really do belong to the cave bear, nevertheless, careful comparison with specimens in museums has proved that this is the case. Every care seems to have been made to utilise to the utmost all parts of this animal, which was apparently the most important game in the surrounding forests, and which no doubt required much labour and time to capture. At the same time, together with the bones of the cave bear are found bones of the elephant and of the rhinoceros, but not many in comparison. These remains, however, show conclusively, by the way in which they have been split up and broken, that man hunted these animals at the time he first appears on the scene. Remains of horses, oxen, cats, and wolves were also met with, and in proof that the early inhabitants were not unmindful of fish, there are the bones and scales of large pike and carp. The smaller bones of mice and frogs do not appear to owe their origin so much to man as to the owls which seem to have held possession of the cave as well.

Great interest attaches to the fragments of pottery which were found in the cave, and which rival the flint flakes in quantity. It appears to have been all hand made, but although rough, shows considerable beauty of shape and form. It is possible to put together from the fragments one or two more or less complete vessels, which, however, show great diversity as to size, &c., some being between 10 and 20 centimetres in diameter. The material of which they are made appears to be clay mixed with sand, but few, if any, seem to have been regularly burnt. Much of the pottery is ornamented with lines or rows of dots, which run in zigzag lines over the wider parts. The internal smoothness would appear to be due to the river mussel, Unio, obtained from the River Naab which flows close by, and of which many well rubbed and polished specimens were found in the cave. A block of granite with one side rubbed smooth, and by long usage appearing quite polished, can hardly be anything else than a well-worn millstone, and this is rendered more probable by two holes having been bored into the upper side as if for the purpose of affixing a handle. The presence of this millstone would indicate the cultivation of land in the immediate neighbourhood, which is confirmed by the finding of several spindles made of clay.

The different objects found in this cave are of great interest, as they apparently run counter to the somewhat hard and fast lines which have been drawn as to different well marked periods in the early history of man.

THE PARIS SIEGE BALLOONS

THE lessons learnt at Paris in regard to balloon navigation will be of great value in any future employment of aërial machines, and the statistics which have now been collected and published are well worthy of a brief notice. As many as sixty-four balloons, it appears, actually started from Paris in good order, with a *personnel* of 161, and with something like three million letters. The first ascent was made on the 23rd of September, 1870, by M. Duruof with safety, and the fifth balloon carried in it Gambetta, who arrived without accident at Amiens after a voyage of four hours. M. Janssen, whom, it will be remembered, was desirous of watching the approaching eclipse in the south of Europe, left Paris with all his instruments complete in the balloon Volta, on the 2nd of December, landing at Savenay (Loire Inférieure) after a journey of five hours and a half. One of the later voyages was made with two cases of dynamite, to be dropped and exploded at a seasonable moment; but fortunately for the enemy no such opportunity presented itself. The last balloon left Paris on the 28th of January, 1871.

Of these sixty-four balloons only seven were unsuccessful in fulfilling their purpose, two of the machines being utterly lost at sea; while five were captured by the enemy. As many as sixteen actually fell within the hostile lines; but the aëronauts were in most cases too quick for their pursuers, and managed to escape. Indeed, of the five actually taken only three were really captured by the enemy's forces, the other two falling in fact upon German soil, namely, in Prussia and Bavaria. The most interesting voyage was certainly that of M. Rollier, who travelled safely from Paris to Christiania in fourteen hours, after a journey across the North Sea of nearly twelve hours. Of the two lost at sea, one was observed to go down by some sailors at Rochelle; while of the other nothing certain is known.

The regularity with which the balloon service was conducted during the winter of 1870 under grave disadvantages will be remembered by all who studied the daily newspapers at that period, the news from the French Capital never being interrupted for more than three or four days together. Most of the aërial machines contained 2,000 cubic metres of gas, and one of them consisted of twin spheres tethered together; they were usually started from the Orleans or North railway stations at nightfall, so that they might escape the vigilance of the German troops posted round the city. Besides a freight of letters the majority carried baskets of pigeons, and in five cases dogs, destined to return with news to the beleagured city; how well the pigeon-post itself was organised may be gathered from the fact that fifty thousand messages were sent into Paris by its means alone.

Some attempts were made by MM. Tissandier Frères to return to Paris by means of aërial machines impelled by favourable winds; but two successive essays made from Rouen on the 8th and 9th of November were quite fruitless. M. Jules Godard, the aëronaut, and M. Nadar were the principal agents in organising the balloon service.

NOTES

AT the Anniversary Meeting of the Royal Geographical Society, held on Monday last, the Royal medals for the encouragement of geographical science and discovery were presented. The Founder's Medal was given to Sir W. Baker for Colonel Henry Yule, C.B., in recognition of the eminent services he has rendered to geography in the publication of his three great works—"A Mission to the Court of Ava," "Cathay, and the Way Thither," and "Marco Polo." The Patron's or Victoria Medal was personally presented to Mr. Robert Berkeley Shaw, for his journeys in Eastern Turkestan, and for his extensive series of astronomical and hypsometrical observations, which have enabled us to fix the longitude of Yarkand, and have given us, for the first time, the basis of a new delineation of the countries between Leh and Kashgar. A gold watch was also awarded to Lieut. G. C. Musters, R.N. (now travelling in America, and represented at the meeting by his brother), for his adventurous journey in Patagonia, through 960 miles of latitude, of which 780 were previously unknown to Europeans; and the sum of 25*l.* to Karl Mauch, in acknowledgment of the zeal and ability with which he has devoted himself for a series of years to the exploration of South-Eastern Africa. Mr. Shaw, who was addressed by the gallant president as "the hero of the hour," was loudly cheered by the meeting when he briefly acknowledged the honour paid to him. The annual geographical medals offered by the Society to the chief public schools were presented to the following successful competitors:—Physical Geography: Gold medal, S. E. Spring-Rice, Eton College; bronze medal, A. S. Butler, Liverpool College. Political Geography: Gold Medal, W. G. Collingwood, Liverpool College; bronze medal, W. C. Graham, Eton College. The president, Sir Henry Rawlinson, K.C.B., then delivered his anniversary address, which was chiefly occupied by tributes to distinguished members who have died during the year, and to a statement of the most recent information respecting the Livingstone Search Expedition.

THE President of the Society of Telegraph Engineers has issued invitations for a *conversazione*, to be held in Lord Lindsay's Laboratory on June 6, at 9 P.M.

AT the meeting of the French Academy of Sciences on May 20, M. Tresca was elected a member of the section of Mechanics in the room of M. Combes, deceased.

THE Dutch Society of Sciences in Haarlem has awarded the great gold Boerhaave Medal to Mr. H. C. Sorby, F.R.S., and elected him a foreign member. This medal, of the gold value of 500 gulden (about forty guineas), has been established three years, and is to be given away every two years to those who during the last twenty years have made themselves particularly meritorious in different departments of Science, according to a fixed rotation, and this year was given for the branch of mineralogy and geology.

AT the last meeting of the Royal Society of Edinburgh, Prof. Turner was presented with the Neill prize and gold medal for the triennial period ending 1871, for his papers on the "Great Finner Whale," and on the "Gravid Uterus and the Arrangement of the Fœtal Membrane in the Cetacea." The Keith prize, for the biennial period ending May 1871, was awarded to Prof. Jas. Clerk Maxwell, F.R.S., for his paper "On Figures, Frames, and Diagrams of Forces."

THE *Medical Times and Gazette* states that M. Jules Simon, the Minister of Public Instruction in France, has accepted in principle the creation of a Faculty of Medicine at Bordeaux to replace that of Strasburg, and that a commission has been appointed to report upon the project in question. It is also in contemplation to establish a School of Medicine and a School of Pharmacy at Lyons.

THE *Revue Scientifique* of May 18th gives an account of the inauguration of the German University of Strasburg, with an interesting sketch of the history of the university under its original German rule, and subsequently to its incorporation into the French Empire by Napoleon I.

MR. FLOWER, the Professor of Anatomy at the Royal College of Surgeons, London, is anxious to collect and exhibit in the Museum of the College a complete set of skulls of all the varieties of the dog. The collection will be of great value as bearing on the question of the variability of the skeleton in domesticated varieties of the same species.

THE following excursions have been arranged by the Geologists' Association to take place in June:—Excursion to Guildford, Saturday, June 1, Directors, Prof. T. Rupert Jones, and Mr. C. J. A. Meyer. Upon arrival at Guildford the members will proceed to inspect the very instructive exposure of the Chalk and Lower Greensand in the neighbourhood of Guildford. The physiography of the district is also extremely interesting, and is well seen from several elevations which will be visited. Excursion to Bromley and Chiselhurst, Saturday, June 15, Director, Mr. J. W. Ilott. Leave Charing Cross for Shortlands Station. Visit the waterworks at Shortlands, and inspect section of well. Walk along railway to Bromley, and examine five sections of the Woolwich and Reading Series in the Palace Park and at the Brick Works. Walk through Sundridge Park, and inspect Sections of Shell Beds. Subsequently visit the Chalk Caves of Camden Park, and return from Chislehurst Station. Excursion to Hendon and Finchley, Saturday, June 22, Director, Dr. Henry Hicks. On arrival at Hendon Station proceed, under the guidance of Dr. Hicks, to inspect the Sections of the Glacial Drift in the neighbourhood of Hendon and Finchley. Return from Finchley Station. The long excursion of the session will be to Ludlow and the Longmynds in July.

DR. STIMPSON, the eminent director of the Chicago Academy of Sciences, has been engaged during the past winter in prosecuting deep-sea explorations in Florida. He first accompanied the United States Coast Survey steamer *Bibb*, when making soundings between Cuba and Yucatan for a submarine cable, but found the sea bottom very poor in animal life. We have previously mentioned that the bottom temperature in the deepest water was about 39·5° F., which may possibly account for the scanty fauna. The bottom consisted of sand and Globigerinæ mixed, in which scarcely anything occurred but shells, mostly dead. Some of the species were identical with those obtained by Mr. Gwyn Jeffreys at a similar depth off the European coast. On their way back from the cable work, the expedition made one haul of the dredge off the Cuban coast, near Havana, in 250 fathoms water, and obtained a superb specimen of the very rare *Pentacrinus Caput Medusæ*, the first ever obtained so near the American coast, and perhaps hardly represented as yet in any of the museums. After returning to Key West the doctor took charge of the dredging on board the Coast Survey steamer *Bache*, but ill-health prevented his prosecuting this to any extent.

Harper's Weekly states that Prof. J. D. Whitney, the accomplished State Geologist of California, has undertaken to collect the facts in regard to the late earthquake, and has proceeded, with this object to Inyo County, the centre of its most active manifestation. As Prof. Whitney has made a specialty of the study of earthquakes and the accompanying and resultant phenomena, we have no doubt that much light will be thrown upon this interesting topic.

WITH reference to the connection between electricity and earthquakes, the *Pall Mall Gazette* quotes from a Californian paper, the *Inyo Independent*, the following curious statements respecting the prevalence of electrical phenomena at the time of the recent earthquake in that State:—"A few days after the big shock, so called, at Cerro Gardo, very loud thunder was heard during a violent snowstorm. With the exception of the snow, the same thing occurred here, and perhaps at other places in the valley. This is remarkable, because almost unprecedented. Immediately following the great shock, men whose judgment and veracity are beyond question, while sitting on the ground near the Eclipse Mines, saw sheets of flame on the rocky sides of the Inyo Mountains, but half a mile distant. These flames, observed in several places, waved to and fro, apparently clear of the ground, like vast torches. They continued for only a few minutes. In this office, one day last week, while one of the proprietors was running a large number of sheets of flat-cap paper through a job press, these sheets, after leaving the press, were affected by the movements of the operator's hand, as a strong magnet would affect iron filings. When his hand was near them, the whole pile, or at least a hundred of them from the top, seemed to float in the air, like tissue paper in a slight breeze. The top sheet would rise at each end up to the hand when held four inches above it, and thus by attraction be moved entirely away from the others. At times during the night sparks of fire were repeatedly emitted from a woollen shawl on being touched by the hand. At the Kearsarge Mill, located at an altitude of nearly 80,000 feet above the sea, the following occurrence was noted by Harry Clawson and P. J. Joslyn:—The former, while sitting with his knees within three inches of a cast-iron stove, felt a peculiar numbing sensation, and, supposing his limbs were 'asleep,' essayed to rub them with his hand. As soon as his hand touched his knee he felt a shock, and immediately after, and for a couple of seconds, a stream of fire ran between both knees and the stove. We will here state, on the authority of a man who had an opportunity of knowing, that the item going the rounds to the effect that no movement of the earth was observable 300 feet underground in the mines is not correct. At Cerro Gardo, and also at the Eclipse Mine, the rocking motion was distinctly observed, especially in the timbering. Small particles of rock were detached, and in both places the miners went to the surface in alarm; but at Cerro Gardo they soon resumed work as before."

TELEGRAMS just received from New York speak of a terrible disaster to the seal fishing fleet on the coasts of Labrador and Newfoundland. Four steamers and nearly forty sailing vessels are reported to have been wrecked among icebergs and the ice fields by a hurricane. The whole of the crews, which averaged ninety men, perished. Later accounts, however, state that the reports of the disaster to the fishing fleet were exaggerated. Only twelve vessels were lost.

A TERRIFIC hurricane visited Madras on May 2. It is described as being the most violent that has occurred there for many years, the devastation occasioned among the shipping being of a terrible character. Nine English vessels are spoken of as having become total wrecks, and the destruction of life is said to have been very great.

NATAL papers describe the great brilliance of the Aurora Australis witnessed both in that colony and in Cape Colony and the Free States on Feb. 4. The *Natal Colonist* of March 5 speaks of the southern aurora being not unfrequently visible there in broad daylight.

A REMARKABLE story from Newfoundland is detailed in a letter to the *New York Times* of April 15, to the effect that a Danish brig just arrived, which had left Disco on March 1, brought information that the *Polaris*, under Captain Hall, had been there for two days undergoing repairs and procuring a fresh supply of provisions. The account goes on to say that on the evening of February 8 the *Polaris* encountered extremely heavy weather, and while lying to, owing to the shallowness of the water, ran among ice snags, which caused a leak in the vessel, and made it necessary to proceed to Disco for repairs. Mysterious intimations were given of wonderful discoveries which had already been made by the *Polaris*, indicating the existence of a genial atmosphere and open seas in the extreme north. Plants indigenous to southern climes were detected in the ice, while a floating stick of wood proved to be northern birch. Throughout the whole of the month of February very little ice was seen, and the skies were literally alive with meteors of the most gorgeous description. On Christmas-day the ship was hemmed in by a heavy field of ice, but the weather was as pleasant as an Italian spring day. Such was the reluctance of Captain Hall to have the further discoveries which he is expecting to make shared by rival expeditions, that, according to the writer, he did not send word of his return to the Secretary of the Navy. The entire story bears little evidence of credibility, and will at least require further confirmation before it can be accepted.

CAPTAIN THOMAS LONG, so well known as the discoverer, in 1867, of Wrangell's Land, situated about seventy to one hundred miles north of Cape Yakan, in Siberia, has written a letter in reference to the plan of exploration by Mr. Octave Pavy, to which we have already referred. While indorsing the idea presented by Mr. Pavy, he takes occasion to claim it as his own, having, as he states, urged this route as long ago as 1867, the time of his first discovery. He does not think that Mr. Pavy will be able to pass through the channels between Spitzbergen and Greenland, or between Nova Zembla and Spitzbergen, as those passages have always been found blocked with ice, and it would be impossible to winter in the ice in such a raft as he has constructed. He thinks it possible that the North Pole may be reached from Wrangell's Land, but that it would be necessary for him to return for winter quarters; but to endeavour to return into the Atlantic with such a craft would be the height of folly. He believes that a vessel, properly fitted for the purpose, could make the passage from Behring Strait to the Atlantic in one year from the time of passing Behring Strait.

PROF. O. C. MARSH describes in the *American Journal of Science* for May four new species of fossil birds, three of them belonging to the genus *Graculavus*, probably closely allied to the cormorants of the present day, and occurring in the cretaceous deposits of New Jersey and of Kansas. The fourth is a species of *Palæotringa*, from the cretaceous greensands of New Jersey. The same paper contains a more elaborate description of the very remarkable new fossil bird named by him in January last *Hesperornis regalis*. This has numerous peculiarities, although it seems to resemble most closely the common loon of the United States. It was, however, much larger, as its complete skeleton would measure nearly six feet from the tip of the bill to the end of the toes. It occurs as a fossil in the gray shale of the upper cretaceous formations near Smoky Hill Fork, in Western Kansas.

WE learn from Rockhampton, Queensland, that on January 31 a fisherman named W. C. Easton discovered an alligator's nest on Eighteen-mile Island, eighteen miles above Rockhampton in the Fitzroy River. The mother was in the nest when Easton made the discovery, but she ran off, "bellowing like a cow after her calf," as Easton fired a shot from his double-barrelled gun into the river. She was about nine feet long. As Easton went up to the nest, a large carpet snake was about to enter it, but the snake, too, fled before his approach. On examining the nest, Easton discovered sixty-seven eggs, which he took away. The eggs were rather larger than a goose's egg, measuring 6½ inches in circumference one way, by 8½ inches the other; 3¼ inches in length, and nearly white, and in shape almost a true ellipse, but rather too long for their breadth. Mr. Easton placed four of the eggs under a hen, and twelve in straw, in the hope of rearing and domesticating some young alligators. The Fitzroy is the most southern river in which the alligator is found on the East Coast of Australia, and is just within the tropics.